

IN THE CLAIMS:

1-28. (Canceled)

29. (Currently Amended) A circulating fluidized bed boiler comprising:

a fire box in which solid fuel is combusted in the presence of oxygen to generate gases containing heated solids;

a fluidized bed containing the heated solids fluidized by a fluidization gas, and an oxygen transport membrane disposed in the fluidized bed, wherein at least a portion of the heated solids contact sufficiently heat the oxygen transport membrane transferring heat thereto such that the oxygen transport membrane extracts oxygen from pressurized air provided thereto for combustion in the fire box; and wherein

the heated solids flow over outer walls defined by the membrane removing oxygen therefrom.

30. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the fluidization gas is CO₂.

31. (Canceled)

32. (Previously Presented) The circulating fluidization bed boiler of claim 29, further includes a fluid line for providing a combustion gas that comprises the fluidization gas and the extracted oxygen from the fluidization bed to the firebox.

33. (Previously Presented) The circulating fluidization bed boiler of claim 29, further includes a fluid pressurizing device that pressurizes the air provided to the oxygen transport membrane.

34. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the oxygen transport membrane is supported within the heated solids in the fluidized bed.

35. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the oxygen transport membrane is disposed above the heated solids in the fluidized bed.

36. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the fluidized bed is disposed within the firebox.

37. (Previously Presented) The circulating fluidized bed boiler of claim 36, wherein the fluidized bed is open to the firebox for receiving descending heated solids in the firebox.

38. (Previously Presented) The circulating fluidized bed boiler of claim 37, wherein the fluidized bed extends along a portion of an inner wall of the firebox.

39. (Canceled)

40. (Canceled)

41. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the oxygen transport membrane includes long tubes supported by intermediate plates.

42. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the oxygen transport membrane includes short tubes with intermediate chambers.

43. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the oxygen transport membrane includes concentric tubes, an inner tube of which serves as a support for a tube of outer membrane.

44. (Previously Presented) The circulating fluidized bed boiler of claim 43, wherein a space is provided between the concentric tubes.

45. (Previously Presented) The circulating fluidized bed boiler of claim 44, wherein the air flows in counter-current in the space between the tubes.

46. (Canceled)

47. (Canceled)

48. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein the oxygen transport membrane is heated to a temperature of approximately greater than 700 degrees.

49. (Currently Amended) A circulating fluidized bed boiler comprising:

a firebox in which solid fuel is combusted in the presence of oxygen that generates a flue gas containing heated solids;

a fluidized bed external to the firebox containing the heated solids separated from the flue gas, wherein the heated solids are fluidized by a fluidization gas; ~~and~~

an oxygen transport membrane being disposed such that at least a portion of the heated solids of the fluidized bed ~~provide sufficient heat for~~ contact the oxygen transport membrane transferring heat thereto ~~wherein~~ such that the oxygen transport membrane extracts oxygen from pressurized air provided thereto for combustion in the firebox; and wherein

the heated solids flow over outer walls defined by the membrane removing oxygen therefrom.

50. (Previously Presented) The boiler of claim 49, further includes a fluid pressurizing device that pressurizes the air provided to the oxygen transport member.

51. (Previously Presented) The boiler of claim 49, wherein the oxygen transport membrane is disposed on the inner periphery of the lower portion of the firebox.

52. (Canceled)

53. (Canceled)

54. (Canceled)

55. (Previously Presented) The boiler of claim 49, wherein the oxygen transport membrane includes short tubes with intermediate chambers.

56. (Previously Presented) The boiler of claim 49, wherein the oxygen transport membrane includes concentric tubes, an inner tube of which serves as a support for a tube of outer membrane.

57. (Previously Presented) The boiler of claim 49, wherein the oxygen transport membrane comprises a plurality of oxygen transport membranes.

58. (Canceled)

59. (Amended) The boiler of claim ~~52~~ 49, wherein the oxygen transport membrane includes tubes disposed horizontally on the hearth of the boiler.

60. (Previously Presented) The boiler of claim 49, wherein the oxygen transport membrane is heated to a temperature of approximately greater than 700 degrees Celsius.

61. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein an oxygen transport membrane is immersed within the heated solids in the fluidized bed and disposed above the heated solids of the fluidized bed.

62. (Previously Presented) The circulating fluidized bed boiler of claim 29, further including a separator that separates the heated solids from the flue gas to provide at least a portion of the heated solids to the fluidized bed.

63. (Previously Presented) The circulating fluidized bed boiler of claim 62, wherein at least a portion of the separated heated solids are provided from the separator to the firebox.

64. (Previously Presented) The circulating fluidized bed boiler of claim 29, wherein at least a portion of the heated solids of the fluidized bed are provided to the firebox.

65. (Previously Presented) The circulating fluidized bed boiler of claim 49, wherein the oxygen transport membrane is supported within the heated solids in the fluidized bed.

66. (Previously Presented) The circulating fluidized bed boiler of claim 49, wherein the oxygen transport membrane is disposed above the heated solids in the fluidized bed.